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The Pennsylvania State University  
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Department of Psychology

RELATING PSYCHOSOCIAL VARIABLES IN HIGH SCHOOL TO ALCOHOL  
USE TRAJECTORIES DURING THE TRANSITION TO YOUNG ADULTHOOD

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## ABSTRACT

This study examined the relationships between psychosocial indicators during adolescence, alcohol use during adolescence and alcohol use trajectories during the transition into early adulthood. Previous researchers have identified a number of different alcohol use trajectories during the transition to young adulthood. This study examined psychosocial variables--including peer focus, social skills, affect, antisocial behavior, gender, and sex-role attitudes--in an attempt to uncover variables related to changes in mean alcohol use and patterns of alcohol use during the transition to young adulthood.

In addition to determining if the psychosocial indicators measured in adolescence are associated with different alcohol use trajectories, this study also examined the relationship between the alcohol use trajectories and young adult outcomes in the relational and educational domains.

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## Chapter 1

### INTRODUCTION

Most American adolescents initiate alcohol use before the end of high school. Indeed, as many as 32 percent become binge drinkers by their senior year (Johnson, O'Malley and Bachman, 1991). Many continue the use of alcohol, and binge drinking, through college. Reports from the Harvard School of Public Health indicate that as many as 44 percent of college students are binge drinkers (Wechsler, Dowdall, Davenport and Castillo, 1995). Yet another group of adolescents abstains from the use of alcohol entirely. Survey data indicate that approximately one-third of all adult Americans never drink alcohol (NIAAA/HHS, 1998). While most individuals adopt more appropriate alcohol use patterns as young adults, a number of individuals continue patterns of excessive alcohol use into adulthood (Bachman, Wadsworth, O'Malley, Schulenberg and Johnston, 1997).

These findings suggest that there are multiple paths leading from the initiation of alcohol use in adolescence to a variety of alcohol use patterns in young adulthood. What antecedent characteristics might distinguish those adults who follow a trajectory of continued or even increased

alcohol use following the transition into adult roles from the majority who adopt more appropriate drinking patterns?

Although several studies have demonstrated the existence of varied alcohol use trajectories (see for example, Schulenberg, O'Malley, Bachman, Wadsworth and Johnston, 1996), few have succeeded in providing prospective markers to differentiate the various trajectories. Most studies have not related personality and social indicators during adolescence to alcohol use trajectories during the transition from adolescence into young adulthood. This study was designed to examine the relationships between psychosocial indicators in adolescence and trajectories of alcohol use during the transition to early adulthood.

#### ALCOHOL USE PATTERNS

Previous research has identified the presence of numerous alcohol use patterns among adolescents and adults, including abstinence. In the following section, I will present a summary of these findings. Additionally, I shall discuss possible connections between the alcohol use patterns of adolescents and those of the adult population.

In exploring adult alcohol use patterns, Thomas Harford and George Mills (1978) found that most adults drink more

regularly but in lesser quantities than younger Americans. Mean quantity of alcohol consumed shows a general decrease from late adolescence throughout adulthood. The mean drinking frequency is essentially the inverse of the quantity measure. Frequency of drinking occasions increased asymptotically from around eleven per month in late adolescence toward a mean of sixteen over the next forty-five years. Females' means were significantly lower than the males' means for each measure, but followed the same general trends. The normative pattern of adult alcohol use appears to be a continual decrease in quantity per occasion with a slight increase in frequency of drinking occasions throughout adulthood.

Harford and Mills (1978) also surveyed the drinking patterns of more than 5,000 American junior high and high school students. They found that the quantity of alcohol consumed at each drinking occasion increased throughout adolescence. This is consistent with the findings of a Harvard School of Public Health study (Wechsler, Dowdall, Davenport and Castillo, 1995) that estimated the prevalence of binge drinking among college students to be 44 percent, compared to the Monitoring the Future study which found the prevalence of binge drinking in high school to be approximately 32 percent (Johnson, O'Malley and Bachman, 1991).

Although the Harford and Mills study suggests general trends in adolescent alcohol use, the cross-sectional nature of their study may have confounded age with cohort effects. Using longitudinal data, John Schulenberg and his colleagues at the University of Michigan (Schulenberg, O'Malley, Bachman, Wadsworth and Johnston, 1996) conducted an analysis of ten cohorts from the Monitoring the Future project and successfully identified six different trajectories for frequent binge drinking during the transition to young adulthood: Chronic, Decreased, Increased, "Fling," Rare, and Never.

The Chronic group contained 12% of the males and 3% of the females in the Schulenberg, *et al.* study. These individuals were frequent binge drinkers in high school and continued this pattern through young adulthood. This pattern parallels C. Robert Cloninger's type II alcoholism. Type II alcoholism has an early onset (before age twenty-five) and is characterized by irresponsible drinking (Cloninger, Bohman, and Figwardson, 1981, as cited in Acuda and Alexander, 1998). The Chronic trajectory is also consistent with what Robert Zucker (1987, 1994) has labeled "antisocial" type alcoholism, which begins in childhood and continues into adulthood.

Thirteen percent of the males and eleven percent of the females in the Schulenberg, *et al.* study fell into the Decreased trajectory. These participants reported high levels of frequent binge drinking in high school but a continual reduction in the level of binge drinking throughout the transition to adulthood. Conversely, the Increased group members (14% of males; 7% of females) reported low levels of binge drinking in high school, but increased in frequency as they developed into young adults. The Increased trajectory is similar to what Cloninger (Cloninger, *et al.*, 1981) refers to as Type I alcoholism and Zucker's (1987, 1994) late onset negative affect type alcoholism. Adult onset (after twenty-five years of age) and a gradual increase in the quantity of alcohol consumed characterize this pattern.

The "Fling" group (9% of males; 10% of females) had a low frequency of binge drinking in high school, a substantial increase between the ages of 19 and 22, and resumed a low frequency by age 23-24. Zucker has classified this pattern as "developmentally limited," beginning in adolescence and ending in young adulthood (1987, 1994).

The Rare group (15% of males; 18% of females in the Schulenberg, *et al.* study) maintained a low level of binge drinking throughout the transition into young adulthood.

One final pattern that must be included is the one exhibited by those individuals who abstain from alcohol use throughout adolescence and into adulthood. With 24% of the males and 45% of the females, the Never group was the modal trajectory in Schulenberg's study of adolescents. Among adults, this alcohol use pattern is estimated to be approximately one-third of the U.S. population by the National Institute for Health (NIAAA/HHS, 1998).

From these studies we can see that a number of alcohol use patterns exist. Although the "Fling" pattern of alcohol use identified by Zucker and by Schulenberg, *et al.* is unique to the adolescent, there is a substantial relationship between the adolescent patterns and adult patterns presented. Most significant for the purposes of this study are those trajectories that are linked to negative outcomes in adulthood.

Cloninger and Zucker have each identified alcoholic trajectories characterized by onset before and after adolescence. These patterns follow the general trend of the adolescent patterns identified by Schulenberg. The Chronic group maintains a high level of alcohol use throughout adolescence and is in keeping with Cloninger's Type II alcoholism. The Increasing group from the Schulenberg, *et*

al. study follows a trajectory that might be expected of an adolescent developing Type I alcoholism.

#### INFLUENCES ON ALCOHOL USE

Why do American adolescents use alcohol? Since psychological research into alcoholism began in the 19th century several theories--from the idea of an inherently evil "demon alcohol" to more modern applications of Personality Theory--have been advanced in an attempt to explain its causes (Cox, 1987). Recent studies of twins and the adopted-away offspring of alcoholic parents have demonstrated a link between family history of alcoholism and individual susceptibility to alcohol dependence (NIAAA/HHS, 1993). Some researchers however, have posited that alcoholism itself may not be inherited; rather an inherited combination of personality traits makes some individuals more susceptible to alcoholism than others (Schuckit, 1987). A study by Kenneth Sher and others (Sher, Walitzer, Wood and Brent, 1991) used structural equation modeling to explore the effects on alcohol involvement of family history, personality, alcohol expectancies and other factors. They found that family history acted on alcohol involvement indirectly though "behavioral undercontrol," rather than



directly. Behavioral undercontrol refers to a set of traits such as impulsivity, and thrill seeking.

Clearly family history plays some role in problematic alcohol use, particularly alcohol dependence. There is also little doubt however, that other factors have substantial influence. Jessor and Jessor (1977) saw problem behaviors, such as alcohol use, as an attempt by the adolescent to overtly signify their transition to adulthood. They have suggested that as adolescents begin to perceive themselves as more adult, they search for various means to demonstrate their individuality, autonomy, and entrance into the adult world. Alcohol use--legally restricted to the adult members of our society--provides the adolescent a means of demonstrating their self-proclaimed adulthood to their peers. From this perspective it is clear that social objectives may play an important role in an adolescent's decision to use alcohol.

Although the role of family history on alcohol use cannot be discounted, the focus of this study is on uncovering psychosocial factors that are related to an adolescent's risk of following a negative outcome trajectory, with regard to adult alcohol use. These factors represent several broad categories, including peer orientation, social skills, individual differences, and other psychosocial factors.

## Peers

The transition to adulthood is a period of substantial physical and psychological development. As formal operational thought evolves, adolescents become more conscious of the perceptions that others have of them. How their peers see them becomes the most important aspect of many of their lives (Santrock, 1998).

Several studies have demonstrated the role of peers and other social factors in adolescent alcohol use. Affiliation with substance-using peers has been shown to be one of the most significant risk factors for adolescent substance use (Hawkins, Catalano and Miller, 1992; Newcomb and Bentler, 1989).

The adolescent's desire to "fit in" with a crowd can be a substantial motivational factor in determining behavior. Studying the role of social conformity in adolescent alcohol use, Marks, Graham and Hansen (1992) found that adolescent prevalence estimates of peer alcohol use at the first time of measurement predicted the participants' level of alcohol use at the second time of measurement, after controlling for the participants' initial use level. This suggests that the participants' alcohol use was based in some part on their perceptions of social norms. Among adolescents, heavy

drinkers are more involved in peer group activities than light, moderate, or nondrinkers (Budd, Eiser, Morgan and Gammage, 1985). This research suggests being more engaged in the adolescent social environment not only acts upon an individual's decision to consume alcohol but also the quantity consumed.

Research by Jacquelynne Eccles and Bonnie Barber (1999) revealed that participation in team sports and prosocial activities (for example, church and volunteer activities) were both associated with positive academic outcomes. Participation in prosocial activities was also related to lower rates of risk taking behaviors. Participation in team sports however was related to greater alcohol use. Although some portion of the relationship between sports participation and alcohol use is due to selection, socialization by the group is also an important factor. Researching the effects of selection and socialization in adolescent friendships, Denise Kandel (1978) found they were each of equal importance in the initiation of marijuana use. Various adolescent peer groups--such as those in the Eccles study--have different alcohol use norms. To some degree, the process of socialization transmits these group norms to its new members.

Exploring the role of peer affiliation in greater depth, Blanton, Gibbons, Gerrard, Conger and Smith (1997)

investigated the idea that adolescents engage in substance use to gain a favorable image. Studying the precursors that lead to the formation of a favorable evaluation of substance users by adolescents, they found that association with peers who encourage substance use was the primary proximal cause of the development of positive prototypes of substance users. These social images then predicted the participants' subsequent level of alcohol use.

The existing research demonstrates a significant role of peer relationships in an adolescent's decision to consume alcohol. The influential role of peers on adolescent alcohol use is coherent with findings that alcohol use declines after the transition into adult roles. Consistent with the routine activities perspective (see for example, Osgood, Wilson, O'Malley, Bachman, and Johnston, 1996; Cohen and Felson, 1979; Hindelang, Gottfredson, and Garofalo, 1978), most young adults "mature out" of their earlier alcohol use patterns as they develop new peer networks in young adulthood.

Although adolescents with a strong peer orientation may use alcohol in an attempt to fit in with their peers by complying with perceived social norms, some adolescents may be using alcohol because of social difficulties. This leads to the next area under study, the relationship between social skills and alcohol use.



### Social Skills

In addition to the direct influence of peers on alcohol use, research also suggests that some adolescents may use alcohol to compensate for real or perceived social deficits. Problem drinkers have been shown to achieve lower social skill scores than drinkers, and drinkers have lower scores than nondrinkers. Hover and Gaffney (1991) studied the relationship between social skills and alcohol use among Australian adolescents using the Adolescent Problem Inventory and the Adolescent Problem Inventory for Girls to measure social skills. They found that eleven percent of the drinkers and fifty percent of the problem drinkers sampled were in the incompetent range of social skills performance. Furthermore, although the majority of the nondrinkers scored in the competent to very competent range of performance, none of the problem drinkers entered into this range. Due to the correlational nature of this research we cannot determine if some segment of the adolescent population is using alcohol in an attempt to enhance deficient social skills or as a means of self-medicating to ease the stress of being less socially adept than the majority of their age mates. Clearly however, there exists a relationship between social skills and adolescent alcohol use.

## Psychological Factors and Individual Differences

Although the idea of an "alcoholic personality" has largely been discredited, individual differences have been linked to negative outcomes in alcohol use patterns (Cox, 1983). Four areas that will be examined in this study include: Affect, Antisocial Behavior, Gender, and Traditional Sex Role Beliefs.

### Affect

Studies of the relationship between affect and adolescent substance use have found that increased stress, anxiety, and depression, and low self-esteem are all associated with adolescent substance use (Dryfoos, 1990; Newcomb and Bentler, 1989). In research with the children of alcoholics, Hussong, Curran, and Chassin (1998) found that a global measure of negative affect predicted concurrent substance use in younger adolescents but did not predict individual change over time. There exists a body of research indicating that the causal relationship between affect and problematic alcohol use may begin with alcohol use and lead to negative affect. This is evidenced by the fact that, despite high levels of initial depression, as

alcoholics progress through treatment their depression attenuates substantially (Cox, 1987). Although these findings come from research conducted with disordered populations, I expected to find a similar relationship between affect and alcohol use in the present sample. Individuals who report higher levels of depression were also expected to report higher levels of alcohol involvement.

### Antisocial Behavior

According to Zucker and Gomberg (1986), "antisocial behavior is part of personality and it plays a significant etiological role [in alcoholism]." Whether using a personality or behavioral definition, several studies have demonstrated the relationship between antisocial behavior and substance use in adolescence.

A relationship between antisocial personality and alcohol misuse has been well established. Among addiction treatment patients with a diagnosis of alcohol dependence, antisocial personality disorder is comorbid in 51% of the cases (NIAAA, 1993). Antisocial personality has also been linked to alcohol misuse among the adolescent population (Clark, Kirisci, and Moss, 1998). A recent longitudinal study of children from age eight through age fifteen found that conduct disorder often predates and predicts later



alcohol use and alcohol use disorders (Clark and others, 1998).

Linking adolescent antisocial behavior to later alcohol use patterns, Bryant, Schulenberg, Bachman, O'Malley and Johnston (1998) found that adolescents who report high levels of school misbehavior are more likely to increase their substance use over time (cited in Bryant and Zimmerman, 1999).

#### Traditional Sex Role Beliefs

Research by Eccles and Barber (1999) found an increased incidence of alcohol use among students involved in team sports, which many consider a traditionally masculine undertaking. This is consistent with David McClelland's Power Theory of alcohol use. McClelland found that men who consumed more alcohol, told stories that adhered more closely to stereotypically traditional sex roles. One interpretation offered by McClelland was that higher levels of alcohol use might be related to a stronger sex role identity (McClelland, Davis, Kalin and Wanner, 1972).

More recently, Blazina and Watkins (1996) found a significant correlation between increased alcohol use among men and scores on the Success, Power and Competition subscales of the Gender Role Conflict Scale (O'Neil, Helms,

Gable, David, and Wrightsman, 1986). Blazina and Watkins suggest that these findings provide support for the idea that alcohol consumption is equated with a greater sense of masculinity.

If alcohol use is equated with greater masculinity, what is the relationship between traditional sex-role beliefs and alcohol use among women? In examining the relationship between female gender-role attitudes and alcohol consumption, Parker and Harford (1992) found support for their hypothesis that traditional female gender-role beliefs provide women with a "moral or cultural protection against heavier drinking (p. 159)." As expected, women who held more egalitarian (less traditional) gender-role attitudes were more likely to be bar patrons, have higher consumption volume, and more likely to abuse alcohol.

I expected to find similar relationships in the present study. Reports of more traditional sex role beliefs were expected to be associated with elevated levels of alcohol use among the male participants, but reduced alcohol use among the females in this study.

### Gender

A great deal of research has demonstrated that men and women differ in their use of alcohol; most significantly in

their level of use, with male drinkers more likely to be categorized as "heavy" drinkers than their female counterparts (NIAAA, 1993). Among college students, males are more likely to drink alcohol (Lo, 1996), and to drink heavily than females (Prendergast, 1994). Men are also more likely than women to continue problem drinking from high school or college into young adulthood (Schulenberg, Wadsworth, O'Malley, Bachman and Johnston, 1996).

Research has also demonstrated gender differences in relationships between psychosocial factors and alcohol use. For example, in studying the relationship between self-esteem and alcohol use among college students, Corbin, McNair, and Carter (1996) found that among females, heavy drinkers had the lowest levels of self-esteem. Although there were no significant differences among male participants, the heavy drinkers tended to have slightly higher self-esteem scores.

I expected to find a protective effect of self-esteem among the females in this study; female respondents who report higher self-esteem were expected to report lower levels of alcohol involvement than their peers with lower levels of self-esteem. I also predicted that self-esteem would be positively related to alcohol use among the male participants.

### Summary

The reviewed research concerning possible influences on alcohol involvement revealed support for the relationships of peer focus, social skills, affect, antisocial behavior, and sex role attitudes with alcohol use. The research in this area shows convincing support for the notion that peers influence the individual adolescent's decision to use alcohol. Those adolescents who are more focused on gaining peer group acceptance may be more likely to use alcohol, in accord with perceived peer norms. Previous research also reveals a relationship between low social skills and increased alcohol involvement, supporting the idea that some individuals may use alcohol to compensate for deficiencies in social aptitude.

The literature concerning the relationship between affect and alcohol use supports the idea that alcohol misuse leads to negative affect. In looking at antisocial behavior, the extant literature shows a link between antisocial behavior and elevated alcohol involvement in adolescence and in adulthood.

Lastly, David McClelland's studies with men and Parker and Harford's research with women put forth the idea that an individual's level of alcohol use was related to their beliefs concerning traditional sex roles. Taken together,

this body of research creates a picture of the many complex and interwoven social-psychological processes that may combine to influence adolescent drinking patterns.

## OUTCOMES

The presence of several distinct drinking trajectories leads to the idea that each may be related to distinct outcomes in adulthood. Research in this area confirms that the level of alcohol use by individuals is related to a number of negative outcomes--beyond health risks from alcohol consumption or accidents due to alcohol impairment. Studies have related elevated alcohol consumption to involvement in abusive or very negative romantic relationships (Maggs, Frome, Eccles and Barber, 1997), increased rates of divorce (Windle and Miller-Tutzauer, 1991) and downward social mobility (Karvonen, Rimpelä and Rimpelä, 1999). There is also, however, some evidence that alcohol use in adolescence may be related to socially desirable outcomes such as higher educational attainment (Maggs, Frome, Eccles and Barber, 1997).

Beyond the relationship of adolescent alcohol use to adult alcohol use outcomes, there is evidence of a relationship between adolescent alcohol use and social adjustment in young adulthood. Research by Jennifer Maggs

and her colleagues found that increased alcohol use in adolescence was related to being involved in romantic relationships in young adulthood that were more abusive or very negative (Maggs, Frome, Eccles and Barber, 1997).

Further, research by Windle and Miller-Tutzauer (1991) found that the rate of separation and divorce among alcohol abusers in their sample of young adults was almost twice that of non-abusers (12.2% versus 6.2%).

Alcohol use has also been related to educational attainment. In a four year, cross sectional study of over 8,000 Finnish adolescents, Karvonen, Rimpelä and Rimpelä (1999) found that regular alcohol use and intoxication were related to downward social mobility, as measured by educational attainment and school enrollment (for example, vocational versus *gymnasium*). However, research by Jennifer Maggs with an American sample found that moderate alcohol use in middle adolescence was related to higher levels of educational attainment in young adulthood (Maggs, et al., 1997).

Although the studies cited in the preceding paragraphs investigated the relationships between alcohol use and a number of young adult outcomes, caution should be used in interpreting the findings. Because of the non-experimental

nature of these studies they can only demonstrate correlations between factors and cannot establish causation.

Consistent with research showing a correlation between alcohol use and negativity in romantic relationships--as well as increased rates of separation and divorce--I expected to find that those individuals who reported higher levels of alcohol use would also report higher levels of conflict in their romantic relationships. Given the disparate findings in research relating alcohol use to educational attainment, I made no specific prediction about this relationship.

#### CURRENT STUDY

The purpose of this study was to determine the relationship between a number of adolescent psychosocial indicators and trajectories of alcohol use during the transition into early adulthood.

Previous studies of adolescent alcohol use have identified a number of distinct alcohol use trajectories during the transition from adolescence into young adulthood but have shown limited success in relating psychosocial indicators to those trajectories. This study attempted to fill a void in the current literature by identifying

antecedent psychosocial variables that are associated with the different alcohol use trajectories.

The goal of this study was to examine the relationship between a collection of psychosocial variables and alcohol use over time using two approaches: one exploring mean level changes in the relationships among variables over time using hierarchical linear modeling and a second, pattern-centered approach, that looked at individual differences in changes over time. This study is unique in the use of both methods of analysis to explore these relationships. Each approach to the analysis of the data answered different questions and, taken together, provided a more in-depth understanding of the relationship between the variables in this study and alcohol use during the transition to young adulthood.

The non-experimental nature of this research does not allow establishment of a definitive causal path, however it allowed me to determine the strength and significance of a number of relationships, both concurrently and over time.

The data for this study was taken from a larger longitudinal study of development (MSALT; Eccles and Barber, 1990) conducted in middle and working class communities in Michigan. The data to be used was collected from the participants during the six year period from their senior year in high school until approximately age twenty-four.



This study focused on answering the following research questions:

*Do the psychosocial indicators selected in this study (Antisocial Behavior, Affect, Peer Focus, Social Skills, Traditional Sex Role Beliefs) relate to concurrent alcohol use in adolescence?* Based on previous research findings showing correlations between peer orientation, social skills, and individual differences, I expected each of the variables to have a significant relationship with alcohol use in high school.

Building on the findings of Marks, Graham and Hansen (1992), peer orientation was expected to be positively related to alcohol use; reflecting the influence of peers and perceived social norms on adolescent behavior. Based on research by Richard Budd and his colleagues (1985), I also expected adolescents who were more engaged in the adolescent social environment to report higher levels of alcohol use. Social skills were expected to have a negative relationship with alcohol use, consistent with research by Hover and Gaffney (1991).

Consistent with research cited previously, Negative Affect (Hussong, Curran and Chassin, 1998) and Antisocial Behavior (Bryant, Schulenberg, Bachman, O'Malley and Johnston 1998) were expected to be positively correlated

with concurrent alcohol use. Traditional Sex Role Beliefs were expected to be positively correlated with concurrent alcohol use among men (Blazina and Watkins, 1996), but negatively correlated among women (Parker and Harford, 1992).

*Are the psychosocial indicators measured in adolescence related to the changes in alcohol use during the transition to young adulthood?* The goal was to explore the possible relationship between the psychosocial indicators--measured in adolescence--and changes in the mean level of alcohol use during the transition to young adulthood. With individual reports of alcohol use over time nested within individual, these data lend themselves to analysis using Hierarchical Linear Modeling (HLM). The nested structure of the data results in strong hierarchies because there is typically more variation between individuals than within individuals (between occasions). HLM modeled the mean alcohol use pattern, provided information about individual variability around the mean growth curve, and determined which individual level variables might predict differences in growth curves.

*Are the drinking trajectories proposed by previous researchers present in this sample?* The goal was to replicate the drinking trajectories proposed by previous researchers in the present sample. Given the finding of similar trajectories in a number of studies (see for example, Schulenberg, O'Malley, Bachman, Wadsworth and Johnston, 1996; Zucker 1987, 1994), I expected to find the same patterns identified in those studies (i.e., Chronic, Increased, Decreased, Fling, Rare, and Never).

*Are the psychosocial indicators measured in adolescence related to these trajectories?* Having identified the unique trajectories present in the sample under study, I examined the relationship between the psychosocial indicators measured in adolescence and each of the trajectories. Going beyond the individual level analyses conducted using HLM, a pattern centered approach allowed an examination of the relationships between the psychosocial variables in this study and alcohol use among groups of individuals with distinct patterns of alcohol involvement during the transition to young adulthood. Specific hypotheses for these relationships are outlined below.

Consistent with the findings of Marks, Graham and Hansen (1992), it was hypothesized that the desire for social

success and peer acceptance are motivational factors for the use of alcohol in adolescence. Similarly, research by Richard Budd and his colleagues (1985) suggests that individuals who were more involved in peer activities (the more popular adolescents) would be likely to consume alcohol more frequently than less engaged individuals. As a result, I expected the level of alcohol involvement among those participants who report more popularity and those who place a high value on social success and peer acceptance to decrease following the transition into young adulthood as a result of changes in their peer networks. Therefore I expected the individuals who place a high value on social success and peer acceptance to be more likely to follow either the Decreased or the Fling trajectory than either the Chronic, Increased, or Rare trajectory.

Negative affect is suspected to result from high levels of alcohol use (Hussong, Curran and Chassin, 1998). Given this, it was hypothesized that the participants who had the lowest scores on the affective scales (more negative affect) would have the highest levels of concurrent alcohol use. Therefore I expected individuals with the most negative affect would be more likely to follow a Chronic or Decreased trajectory.

Research has shown a link between antisocial behavior and adolescent alcohol use (Zucker and Gomberg, 1986).

Additional research has shown that antisocial adolescents are also more likely to increase their substance use over time (Bryant, Schulenberg, Bachman, O'Malley and Johnston, 1998; cited in Bryant and Zimmerman, 1999). These findings lead to the hypothesis that the participants in the present study who score highest in antisocial behavior will also have high levels of alcohol use in the early waves of this study. Further, they were expected to maintain or increase those levels across the transition to young adulthood--placing these individuals in the Chronic or Increased groups.

Those individuals who engaged in non-criminal acts of rebellion in high school were not expected to follow the same trajectory as the most antisocial members of the sample. I hypothesized that adolescent rebellion may include alcohol use as a means of demonstrating adult status, as posited by Jessor and Jessor (1977). I expected the data to reveal the rebellious adolescents adopting normative alcohol use patterns in young adulthood, though they may have elevated levels of alcohol use during adolescence. This would be reflected by higher ratings of rebelliousness among the Decreased and the Fling groups.

Given the research showing a relationship between alcohol use and traditional sex role beliefs (Blazina and Watkins, 1996; Parker and Harford, 1992), I hypothesized

that those male individuals with more traditional sex role beliefs would have elevated alcohol use levels in young adulthood. Conversely, female individuals with more traditional sex role beliefs were expected to have reduced alcohol use levels in young adulthood. This would be represented in the data by high scores on questions about traditional sex role beliefs among the Chronic and Increased groups for men, and the Decreased and Rare groups for women.

Lastly, based on findings by Hover and Gaffney (1991) it is hypothesized that those participants who were the least proficient socially would have elevated alcohol use levels across the transition to young adulthood. This would produce low ratings of social skills in the Chronic group.

*Are the alcohol use trajectories in the sample related to specific young adult outcomes?* I expected to demonstrate that those individuals who followed a negative outcome trajectory would be likely to report more conflict in their romantic relationships (Maggs, Frome, Eccles and Barber, 1997). Given the disparate findings in studies of the relationships between educational attainment and alcohol use by Maggs and others (1997) and Karvonen and others (1999), no specific hypothesis was offered for the relationship

between any specific alcohol use trajectory and educational attainment in young adulthood.

## Chapter 2

### METHOD

#### Sample and Procedure

The sample for this study was drawn from the Michigan Study of Adolescent Life Transitions (MSALT; Eccles and Barber, 1990). The sample represents a broad range of socio-economic levels and educational backgrounds, drawn from generally middle and working class, White (see Table 1), urban and suburban communities in Southeastern Michigan. The MSALT is a large, longitudinal study of development. Currently, data have been collected at eight points:

	Wave 1	-	Sixth Grade, Fall Semester
	Wave 2	-	Sixth Grade, Spring Semester
	Wave 3	-	Seventh Grade, Fall Semester
	Wave 4	-	Seventh Grade, Spring Semester
	Wave 5	-	Tenth Grade
T <sub>1</sub>	Wave 6*	-	Twelfth Grade
T <sub>2</sub>	Wave 7*	-	Three years after High School
T <sub>3</sub>	Wave 8*	-	Six years after High School

\* Waves used in current study

Data used in this study were collected from the participants at three points in time: during their senior



year in high school ( $T_1$ ), at age 21 ( $T_2$ ), and at age 24 ( $T_3$ ). At  $T_1$ , participants completed self-administered questionnaires in their school cafeteria or auditorium. At  $T_2$  and  $T_3$ , questionnaires were mailed to each participant with a postage-paid return envelope. A total of 1160 participants participated at  $T_1$ . The response rate at  $T_2$  of those participants who participated at  $T_1$  was approximately seventy percent; the response rate at  $T_3$  of those participants who participated at  $T_2$  was approximately seventy-four percent. Cross sectional analyses were conducted using data from those individuals who participated at  $T_1$  ( $N = 1160$ ). Longitudinal analyses were conducted using data from those individuals who participated in all three data collection points for this study ( $N = 621$ ).

Table 1

Racial Composition of the Sample at T<sub>1</sub>

	Frequency	Percent
White	652	56.2%
Black	41	3.5%
Asian-American	9	0.8%
Latino/Latina	2	0.2%
Native American	10	0.9%
Other	11	0.9%
Not Reported	435	37.5%
Total	1160	100.0%

Table 2

Racial Composition of the Sample at T<sub>3</sub>

	Frequency	Percent
White	581	93.6%
Black	8	1.3%
Asian-American	9	1.4%
Latino/Latina	4	0.6%
Native American	3	0.5%
Other	1	0.2%
Mixed	8	1.3%
Not Reported	7	1.0%
Total	621	100%

## Measures

The data to be analyzed represent the participants' responses on fourteen measurement scales consisting of a total of forty-nine questions concerning four broad topic areas: Problem Behavior, Affect, Social Variables, and Young

Adult Outcomes. A brief description of each of the scales follows.

#### Household Income

Household income was measured by responses to the following question: "About how much is your current family income each year? (If you live with one of your parents, only give the income for that parent)." Possible responses ranged from 1=\$10,000 or less to 6=\$80,000 or more.

#### Alcohol Use

Alcohol use at each wave was measured with a single question measuring frequency of getting drunk during the last six months. Answers ranged from 1=never to 7=21 or more times.

#### Problem Behavior

*Serious Problem Behavior.* Adolescent involvement in serious problem behavior was measured at T<sub>1</sub> using a six-item scale measuring frequency of involvement in various criminal activities such as damaging property, shoplifting, and carrying a weapon. Participants indicated the number of times they had engaged in each of the behaviors during the

last six months using a seven point scale ranging from 1=never to 7=21 or more times ( $\alpha=0.71$ ).

*Rebellious Behavior.* Adolescent rebelliousness was measured at  $T_1$  with a five-item scale ( $\alpha=0.81$ ). Respondents indicated how often in the last six months they had engaged in rebellious behaviors. Sample items include "Disobey parents on an important issue" and "Lie to parents about something important." Higher scores indicate greater rebelliousness.

#### Affect

*Self-esteem.* A three-item scale assessed the participants' self-esteem ( $\alpha=0.81$ ) at  $T_1$ . Sample items included "How often do you feel good about yourself?" and "How often do you feel satisfied with yourself the way you are?" Response formats ranged from 1=never to 7=daily, with higher scores indicating higher self-esteem.

*Depression.* Participants indicated their level of depression at  $T_1$  by responding to four questions such as "How often do you feel unhappy, sad or depressed?" and "How often do you feel lonely?" Possible responses ranged from

1=never to 7=daily ( $\alpha=0.73$ ). Higher scores indicate higher levels of depression.

*Future Worry.* ( $\alpha=0.79$ ). Participants' worry about their future, at  $T_1$ , was measured with a two-item scale. The two items were "How often do you worry that you will not get a good job when you are an adult?" and "How often do you feel discouraged about the future?" Responses ranged from 1=never to 7=daily, with higher scores indicating greater anxiety about their future.

#### Social Variables

*Importance of Social Success.* The value placed on social success by the adolescents' during high school ( $T_1$ ) was measured with a five-item scale ( $\alpha=0.75$ ). Sample items included "For me being popular is . . ." and "For me, making friends is . . ." Possible responses ranged from 1=not at all to 7=very important, with higher scores indicating a greater need for social acceptance.

*Dissatisfaction with Level of Popularity.* Satisfaction with personal popularity at  $T_1$  was measured with a two-item scale ( $\alpha=0.74$ ). Items were "I wish I were more popular" and "I wish I were more popular with members of the opposite

sex." Response ranges were 1=strongly disagree to 7=strongly agree, with higher scores indicating greater dissatisfaction. I infer that individuals with greater dissatisfaction in this are less strongly connected to the adolescent social milieu.

*Peer Focus.* Fuligni's measure of extreme peer focus (Fuligni & Eccles, 1993) was used to measure the participants peer orientation during high school. This is a four-item scale measuring the adolescents' focus on peers, to the detriment of other activities ( $\alpha=0.68$ ). Sample items include "Would you let your work slip or get a lower grade to be popular with friends?" and "It's okay to break parents' rules to keep your friends." Participants responded to each question using a seven point scale.

*Difficulty Making Friends.* This two-item scale was selected as a measure of the participants' self-perceived social skills ( $\alpha=0.72$ ). During high school ( $T_1$ ), participants answered a question regarding their level of difficulty in making friends using a seven point scale with 1=very easy to 7=very hard. Participants also responded to a question comparing their ability to make friends with that of their peers. Responses on the second question ranged

from 1=much less difficult to 7=much more difficult. Higher scores indicate greater difficulty making friends and lower self-perception of social skill.

*Traditional Sex Role Beliefs.* This eight-item scale measured the participants' acceptance of traditional sex roles during high school ( $\alpha=0.85$ ). Participants reported their level of agreement with statements regarding traditional sex roles. Participants responded on a seven-point scale with a range from 1=strongly disagree to 7=strongly agree. Higher scores indicated greater acceptance of traditional roles. Items on this scale included "Having a career takes away from a woman's relationship with her husband" and "Men are naturally better at mechanical things than women."

#### Young Adult Outcome Variables

*Educational Attainment.* This variable was measured with a single question: "What was the last year of schooling you completed." Participants' responses ranged from 1=9th grade through 19=3 or more years of graduate school. The scale was arranged such that a high school diploma was given more weight than a GED. Similarly, college attendance was scored higher than vocational training. This variable was assessed

only during the third time of measurement, when the modal age was 24.

*Relationship Conflict.* This four-item scale reflects negative aspects of the participants' romantic relationships ( $\alpha=0.78$ ). Participants answered questions regarding the frequency of various conflictual behaviors in their romantic relationships such as shouting, fighting, throwing things, and hitting over the last month. Responses ranged from 1=never to 7=always, with higher scores indicating more negative relationships. This variable was assessed at T<sub>3</sub>.



## Chapter 3

### RESULTS

Each research question is presented below, followed by the analysis strategy used to answer the question.

*Do the psychosocial indicators selected in this study relate to concurrent alcohol use in adolescence?* To examine the concurrent relationships between alcohol and the measures of antisocial behavior, affect, and other psychosocial variables I computed the correlations of each of the variables measured at T<sub>1</sub> with alcohol use at T<sub>1</sub> to determine the magnitude of the individual relationships and their statistical significance. Because Traditional Sex Role Beliefs and Self-esteem were expected to be positively related to alcohol use among males but negatively among women, separate correlations for these two variables were calculated for each sex.

In accordance with my hypotheses, Antisocial behavior was significantly and positively related to higher levels of alcohol use in high school (see Table 3). Among the affective measures, Depression and Worry About the Future also showed significant positive relationships with higher

levels of alcohol use in high school, although the zero-order correlations were considerably small.

With the exception of Dissatisfaction with Level of Popularity, the measures of peer orientation were also found to have the predicted relationships with alcohol use (see Table 3). Dissatisfaction with Level of Popularity showed a trend toward significance ( $p = .056$ ), but was related in the direction opposite of my expectations.

Lower perceived levels of social competence also demonstrated a relationship with alcohol use that was contrary to my expectations. Individuals who reported greater difficulty making friends were expected to report higher levels of alcohol use. The results showed that Difficulty Making Friends actually tends to be a protective factor, with individuals reporting the greatest difficulty also reporting lower levels of alcohol involvement ( $r = -0.140$ ,  $p = .000$ ).

In examining any possible gender differences among the preceding variables, I found the only variable with a different relationship for each sex was Dissatisfaction with Level of Popularity. Males who were more satisfied with their level of popularity showed a non-significant tendency to score higher on the alcohol use measure ( $r = -0.041$ , n.s.). Conversely, females who were more dissatisfied with their level of popularity reported more frequent alcohol use

than their peers who were more satisfied with their popularity ( $r = 0.079$ ,  $p = .048$ ).

Traditional Sex Role Beliefs and Self-esteem were expected to have different relationships with alcohol use for males and females. Although Traditional Sex Role Beliefs did have a significant relationship with higher alcohol use among the males ( $r = 0.169$ ,  $p = .000$ ) it was wholly unrelated to high school alcohol use among the female respondents ( $r = 0.002$ ,  $p = .961$ ). Conversely, Self-esteem had a significant relationship with female alcohol use in high school ( $r = -0.136$ ,  $p = .000$ ) but was not significantly correlated with male alcohol use ( $r = -0.016$ ,  $p = .732$ ). As expected, the relationship between Self-esteem and alcohol use was negative among the females, with higher self-esteem related to lower alcohol use.

With few exceptions the variables exhibited the expected relationships. Counter to my predictions, males who reported lower self-esteem had a non-significant tendency to drink more alcohol than their peers with higher self-esteem scores. Also, these analyses revealed no relationship between Traditional Sex Role Beliefs and concurrent alcohol use among the female respondents.

The coefficients for these variables were statistically significant but in some cases were not large in magnitude. The coefficients for all of the variables are still large

enough to be meaningfully interpreted. Overall this analysis shows that the psychosocial variables of behavior and social perceptions are strongly related to the measure of alcohol use. The relationships between self-beliefs, sex roles, and affect also showed consistent but weaker relationships.

Table 3

Correlations Between Psychosocial Variables and Alcohol Use

Variable	N	Correlation	p-value
ANTISOCIAL BEHAVIOR			
Serious Problem Behavior	1160	0.384	.000
Rebelliousness	1159	0.486	.000
AFFECT			
Depression	1155	0.061	.039
Worry About the Future	1152	0.063	.032
PEER ORIENTATION			
Importance of Social Success	1100	0.252	.000
Dissatisfaction with Popularity	1098	0.058	.056
Fuligni's Peer Focus	1100	0.321	.000
SOCIAL SKILLS			
Difficulty Making Friends	879	-0.140	.000

Table 4

Correlations Between Self-esteem, Traditional Sex Role  
Beliefs and Female Alcohol Use

Variable	N	Correlation	p-value
Self-esteem	669	-0.136	.000
Traditional Sex Role Beliefs	673	0.002	.961

Table 5

Correlations Between Self-esteem, Traditional Sex Role  
Beliefs and Male Alcohol Use

Variable	N	Correlation	p-value
Self-esteem	486	-0.016	.732
Traditional Sex Role Beliefs	485	0.169	.000

*Are the psychosocial indicators measured in adolescence related to changes in alcohol use during the transition to young adulthood?* Hierarchical Linear Modeling (HLM) was used to determine how the psychosocial variables measured in adolescence impact the participants' initial alcohol involvement in adolescence and changes in alcohol involvement during the transition to young adulthood.

The hierarchical nature of repeated measures data (with individual responses nested within individuals) lends itself to analysis using HLM. Additionally the organization of longitudinal data as a pooled time-series data set allows HLM to effectively use incomplete data sets (such as responses from individuals who did not participate in all waves or did not respond to all questions).

Level 1 of the analyses is the "occasion," or time level. This consists of the individual participants' scores on the measure of alcohol involvement at  $T_1$  (senior year),  $T_2$  (age 21), and  $T_3$  (age 24). Level 2 is the individual level. Variables at this level include sex and the psychosocial variables measured during the participants' senior year in high school. Also included at level two is a measure of household income as a proxy for socio-economic status.

The hierarchical analysis began with the fitting of an unconditional model with no level 2 predictors. This model provided baseline statistics for evaluating future models (Bryk and Raudenbush, 1992). The unconditional model for these analyses was as follows:

$$\text{Level 1 - Alcohol Use}_{ti} = \pi_{0i} + \pi_{1i}\text{Time}_{ti} + e_{ti}$$

$$\text{Level 2 - } \pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

Because not all participants completed each data collection at exactly the same point in time, I measured time by using the number of months elapsed since the first wave. Using months elapsed as the metric for time provides a more accurate measure than simply using the wave number and also facilitates interpretation of the models by setting the term for time equal to zero at the first time of measurement.

The estimated mean intercept,  $\beta_{00}$ , and mean growth rate,  $\beta_{10}$ , for alcohol use during the transition into young adulthood were 3.920 ( $p = .000$ ) and -0.005 ( $p = .006$ ), respectively. These results indicate that the average level of alcohol involvement while in high school was approximately 3.9, on a scale from one to seven. This corresponds to approximately five episodes of drunkenness in the past six months. The mean growth rate reflects a slight



decrease in mean alcohol use (every month) over the transition to young adulthood. Both parameters in the unconditional model have significantly large  $t$  statistics, calculated as the ratio of their estimated effects to their standard error. This indicates that each of these parameters is necessary for describing the mean growth trajectory.

The unconditional model also provided estimates of the individual variance from the mean curve. The estimate of the individual level variance of the intercept term,  $r_{0i}$ , was 1.93786 ( $p = .000$ ), indicating substantial variation in the level of alcohol use among high school seniors. The estimate of the individual level variance in growth rate was small but significant,  $r_{1i} = 0.00002$ ,  $p = .017$ , indicating significant variance in the growth of alcohol use at the individual level with approximately equal numbers of individuals reporting increases and decreases on the alcohol use measure.

The next step in the analyses was to introduce the level two predictors into the model. Also included are interaction terms (sex X variable) for the two variables that were expected to have different relationships with each sex (Self-Esteem and Traditional Sex Role Beliefs). I have also included an interaction term for Dissatisfaction with Level of Popularity, which was found to have a different

relationship with each sex in the preceding analyses. The individual level (level two) model becomes:

$$\pi_{0i} = \beta_{00} + \beta_{01}\text{Depression} + \beta_{02}\text{Dissatisfaction with Level of Popularity} + \beta_{03}\text{Difficulty Making Friends} + \beta_{04}\text{Peer Focus} + \beta_{05}\text{Worry About the Future} + \beta_{06}\text{Rebelliousness} + \beta_{07}\text{Serious Problem Behavior} + \beta_{08}\text{Importance of Social Success} + \beta_{09}\text{Sex Role Beliefs} + \beta_{010}\text{Self-Esteem} + \beta_{011}(\text{Sex} * \text{Sex Role Beliefs}) + \beta_{012}(\text{Sex} * \text{Self-esteem}) + \beta_{013}(\text{Sex} * \text{Dissatisfaction with Level of Popularity}) + \beta_{014}\text{Sex} + \beta_{016}\text{Income} + r_{0i}$$

$$\pi_{1i} = \beta_{11} + \beta_{11}\text{Depression} + \beta_{12}\text{Dissatisfaction with Level of Popularity} + \beta_{13}\text{Difficulty Making Friends} + \beta_{14}\text{Peer Focus} + \beta_{15}\text{Worry About the Future} + \beta_{16}\text{Rebelliousness} + \beta_{17}\text{Serious Problem Behavior} + \beta_{18}\text{Importance of Social Success} + \beta_{19}\text{Sex Role Beliefs} + \beta_{110}\text{Self-Esteem} + \beta_{111}(\text{Sex} * \text{Sex Role Beliefs}) + \beta_{112}(\text{Sex} * \text{Self-esteem}) + \beta_{113}(\text{Sex} * \text{Dissatisfaction with Level of Popularity}) + \beta_{114}\text{Sex} + \beta_{115}\text{Income} + r_{0i}$$

The results of these analyses indicate that half of the psychosocial variables (Difficulty making friends, Peer Focus, Importance of Social Success, Serious Problem Behavior, and Rebelliousness) were significantly related to the initial alcohol use status. The only significant interaction on the intercept term was between Traditional Sex Role Beliefs and Sex, with men holding more traditional beliefs being likely to drink more in high school ( $\beta_{011} = 0.203$ ,  $t = 1.956$ ,  $p = .050$ ).

Worry about the Future, Rebelliousness, and Serious Problem Behavior were significantly related to the growth rate. Those adolescents who reported more worry about their future were more likely to have a decrease in alcohol

involvement during the transition to young adulthood ( $\beta_{15} = -0.004$ ,  $t = -2.694$ ,  $p = .007$ ). Participants who reported more adolescent rebellion or criminal behavior in high school were also more likely to have a decrease in alcohol use over time ( $\beta_{16} = -0.007$ ,  $t = -3.996$ ,  $p = .000$  and  $\beta_{17} = -0.017$ ,  $t = -4.240$ ,  $p = .000$ , respectively). Charts 1, 2, and 3 illustrate the relationships between these variables and alcohol use over time by contrasting the slopes for the first and fourth quartiles on each of these variables.

The interaction between Sex and Dissatisfaction with Level of Popularity approached significance ( $\beta_{113} = 0.006$ ,  $t = 1.946$ ,  $p = .051$ ), indicating that male respondents who were less satisfied with their level of popularity were more likely to increase their alcohol use over time. The majority of the psychosocial variables did not demonstrate a significant relationship with the dependent variable however. Neither Sex nor Household Income was related to initial status or growth rate (see Tables 5 and 6).

With the exception of Traditional Sex Role Beliefs the relationship between each of the variables and initial state (intercept) was the opposite of their relationship with change over time. This suggests that those individuals who reported more episodes of drunkenness initially had the greatest decrease over time, probably due to change toward the mean.

The variance components from the final model indicate substantial variation about the mean in the initial level of alcohol use among high school seniors ( $\underline{r}_0 = 1.104$ ,  $p = .000$ ). There was also a significant amount of variation in individual patterns of alcohol use over time,  $\underline{r}_{1i} = 0.00007$ ,  $p = .025$  (See Table 6).

The coefficients and variance component for the growth term appear very small in magnitude; this is a consequence of using "months since  $T_1$ " as the metric for time. Because the data span more than eighty months the coefficients for the growth term, which are all multiplied by the time variable ( $\text{Time}_{ti}$ ), are understandably small in comparison to the coefficients for the intercept term.

Figure 1

Relationship Between Future Worry and Alcohol Use Over Time

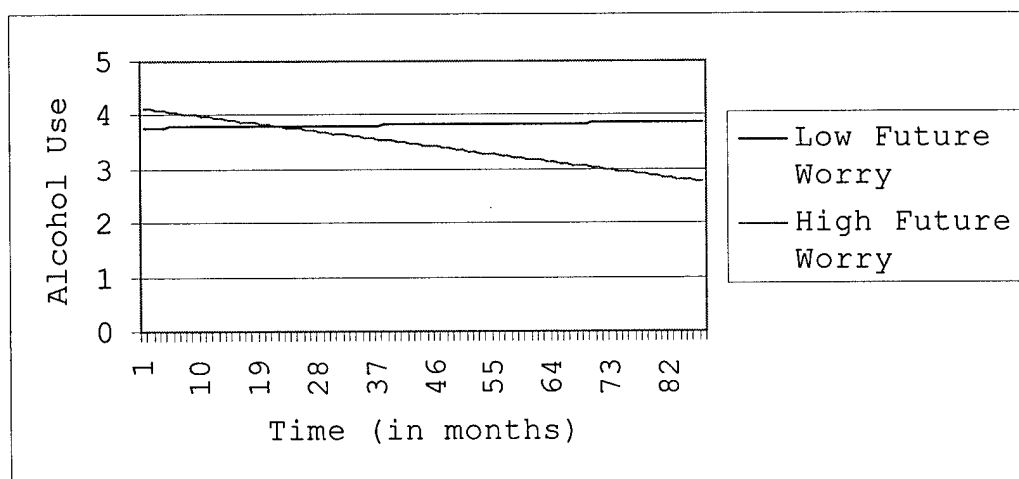


Figure 2

Relationship Between Rebelliousness and Alcohol Use Over  
Time

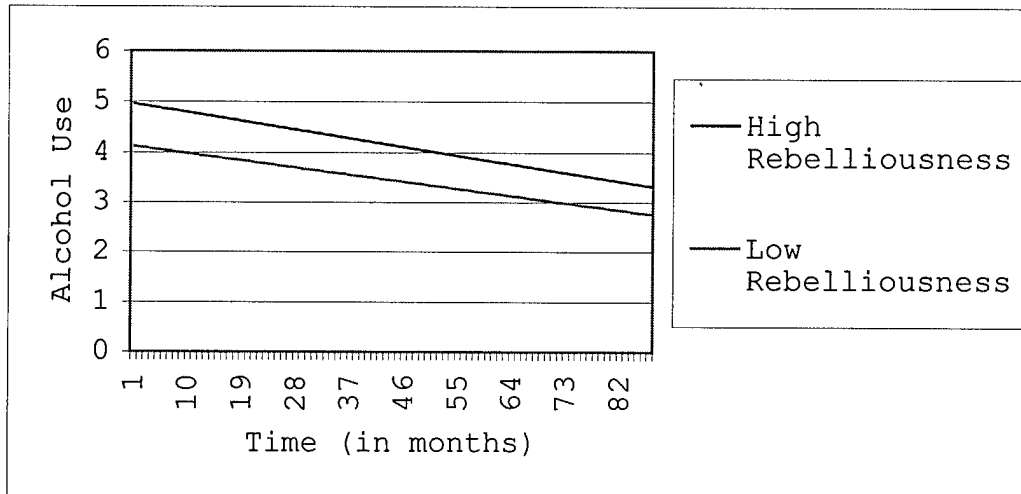


Figure 3

Relationship Between Serious Problem Behavior and Alcohol

Use Over Time

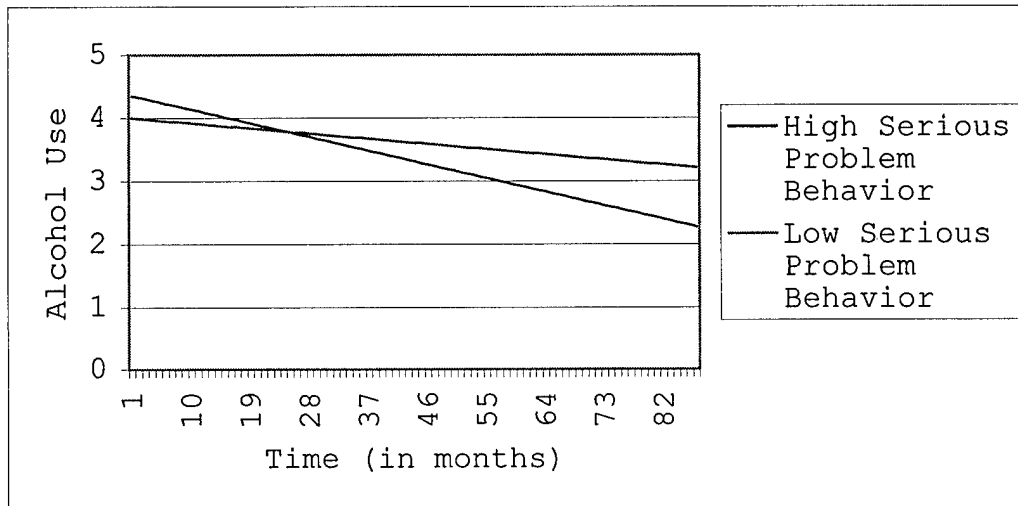


Table 6

Effect of Psychosocial Variables on Alcohol Use in High School

Fixed Effect		Coefficient	t-ratio	p-value
For the Intercept, $\pi_{0i}$				
Constant	$\beta_{00}$	2.038606	2.839	0.005
Depression	$\beta_{01}$	-0.149363	-1.712	0.086
Dissatisfaction with Popularity	$\beta_{02}$	-0.138331	-1.739	0.082
Difficulty Making Friends	$\beta_{03}$	-0.119474	-1.985	0.047
Fuligni's Peer Focus	$\beta_{04}$	0.230936	2.727	0.007
Worry About the Future	$\beta_{05}$	0.087843	1.583	0.113
Rebelliousness	$\beta_{06}$	0.610419	9.245	0.000
Serious Problem Behavior	$\beta_{07}$	0.415597	2.899	0.004
Importance of Social Success	$\beta_{08}$	0.290450	2.741	0.007
Traditional Sex Role Beliefs	$\beta_{09}$	-0.072599	-1.002	0.317
Self-esteem	$\beta_{010}$	-0.147448	-1.816	0.069
Sex X Sex Role Beliefs	$\beta_{011}$	0.203445	1.956	0.050
Sex X Self-esteem	$\beta_{012}$	0.022723	0.185	0.854
Sex X Dissatisfaction w/ Popularity	$\beta_{013}$	-0.141621	-1.344	0.179
Sex	$\beta_{014}$	-0.563401	-0.641	0.522
Household Income	$\beta_{015}$	-0.018480	-0.754	0.451

Table 7

Effect of Psychosocial Variables on Alcohol Use Growth Rates

Fixed Effect		Coefficient	t-ratio	p-value
For TIME slope, $\pi_{1i}$				
Constant	$\beta_{10}$	0.038224	1.942	0.052
Depression	$\beta_{11}$	0.004427	1.792	0.073
Dissatisfaction with Popularity	$\beta_{12}$	0.000330	0.153	0.879
Difficulty Making Friends	$\beta_{13}$	0.001879	1.119	0.264
Fuligni's Peer Focus	$\beta_{14}$	-0.002594	-1.147	0.252
Worry About the Future	$\beta_{15}$	-0.004046	-2.694	0.007
Rebelliousness	$\beta_{16}$	-0.007205	-3.996	0.000
Serious Problem Behavior	$\beta_{17}$	-0.016717	-4.240	0.000
Importance of Social Success	$\beta_{18}$	-0.001828	-0.624	0.532
Traditional Sex Role Beliefs	$\beta_{19}$	-0.003121	-1.605	0.108
Self-esteem	$\beta_{110}$	0.000587	0.263	0.793
Sex X Sex Role Beliefs	$\beta_{111}$	0.001792	0.638	0.523
Sex X Self-esteem	$\beta_{112}$	-0.000807	-0.237	0.813
Sex X Dissatisfaction w/ Popularity	$\beta_{113}$	0.005572	1.946	0.051
Sex	$\beta_{114}$	-0.014577	-0.608	0.543
Household Income	$\beta_{115}$	0.000975	1.453	0.146

Table 8

Variance Components

Fully Unconditional Model			p-value
Intercept	$r_0$	1.93786	0.000
Slope	$r_1$	0.00002	0.017
Level 1	e	3.49248	
Final Model			
Intercept	$r_0$	1.10350	0.000
Slope	$r_1$	0.00007	0.025
Level 1	e	3.15736	

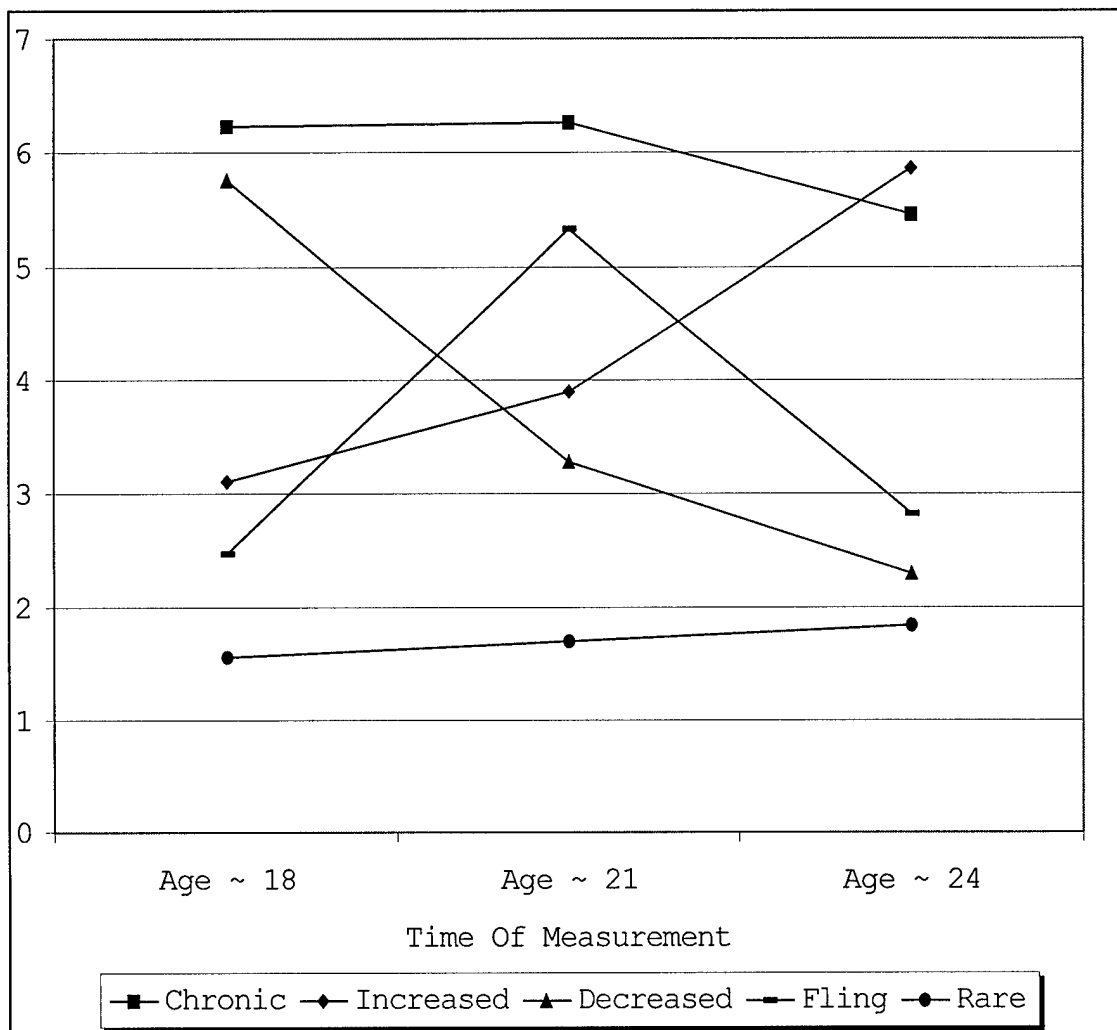


*Are the drinking trajectories proposed by previous researchers present in this sample?* Prior research by Schulenberg and his colleagues found seven distinct trajectories of binge drinking: Chronic, Increased, Decreased, "Fling," Rare, Never, and "Remaining." Building on this previous work, I used K-means cluster analysis to replicate these trajectories in the present sample.

The cluster analysis in this study was based on self-reported frequencies of drunkenness, similar to the binge drinking measure used in the Schulenberg study. Less than two percent of the participants in the present study (ten female and four male) abstained from using alcohol throughout the duration of the study. This, combined with the fact that all participants who reported any alcohol use also reported some incidence of drunkenness, precludes the existence of a Never group in the present sample. Excluding the Never trajectory, I was able to identify the remaining substantive trajectories (Chronic, Increased, Decreased, Fling, and Rare) in the present sample (see Figure 1). Split-half reliability analysis revealed no significant differences between the clusters produced independently in each random half of the sample ( $\chi^2_4 = 1.877$ ;  $p = .758$ )

Figure 4

Trajectories Identified in the Present Sample



*Are the psychosocial indicators measured in adolescence related to these trajectories?* Although the HLM analyses provided substantial information about the relationship between a number of psychosocial variables and alcohol use, both concurrently and over time, the presence of significant variability around the mean in both initial status and change over time, coupled with research suggesting the presence of unique trajectories of alcohol use over time indicates the need for further analysis. Relating the psychosocial variables to the several trajectories of alcohol involvement present in this sample allows a more in-depth understanding of the relationship of the variables to alcohol use in the distinct sub-groups of the sample. In these analyses each of the eleven psychosocial variables served as independent variables. The trajectories, derived from the preceding cluster analysis, served as the dependent variable. Because "Trajectory" is a categorical outcome variable I used multinomial logistic regression to determine the relationship between psychosocial variables measured in high school and the alcohol use trajectories followed during the transition to young adulthood.

The samples for these analyses were limited to those individuals who met the following criteria:

- 1) Individuals who had completed all of the psychosocial measures
- 2) Individuals who had completed the question concerning household income during high school
- 3) Individuals who had provided enough information concerning alcohol use to be placed in a specific trajectory--requiring that they had also responded to the alcohol use question during all waves.

Among the female participants, 157 individuals met these criteria. Eighty-six male participants also completed all required questions.

The dependent variable had five categories: Increased, Decreased, Chronic, Fling, and Rare. The Rare category served as the reference category for all of these analyses. The probability of membership in the other categories was compared with the probability of membership in the reference category (Rare Trajectory). The magnitude and significance of the coefficient for each of the psychosocial predictor variables specifies the relationship between the predictor variables and each trajectory. The exponentiated coefficient from the multinomial logistic regression ( $e^{\beta}$ ), provides a measure of the change in odds of a person following a given trajectory, relative to the reference trajectory. An exponentiated coefficient greater than one indicates that the variable is associated with a greater

likelihood of following the comparison trajectory (either Chronic, Increased, Decreased, or Fling), as opposed to following the reference (Rare) trajectory. An exponentiated coefficient of less than one indicates that the variable is associated with a higher likelihood of following the Rare trajectory than the comparison trajectory.

Using multinomial logistic regression to examine the relationships between psychosocial variables and the five alcohol use trajectories resulted in a model with significant explanatory power ( $\chi^2 = 164.73$ ,  $p = .000$ ) that also accounted for approximately half of the variance (Cox and Snell psuedo- $R^2 = 0.492$ ). Using the log likelihood ratio test, four of the ten variables evaluated in this model (Peer Focus, Importance of Social Success, Serious Problem Behavior, and Income) did not make a statistically significant contribution to the explanation of the dependent variable. Depression, Dissatisfaction with Level of Popularity, Difficulty making Friends, Worry about the Future, Rebelliousness, and Respondent's Sex were all found to make a significant contribution in explaining trajectory membership. Rather than dropping the non-significant variables from the model in order to form a more parsimonious model, I have retained them in order to control for any effects that they may have.

Significant results for each comparison in these logistic regression analyses are presented in Figures 5 through 8. In these figures, factors associated with a greater likelihood of following the comparison trajectory (as opposed to the reference, or Rare trajectory) produce an exponentiated coefficient that is greater than 1. Hence an exponentiated coefficient of 3.0 indicates that a one unit increase on the variable in question will triple the odds of the individual not following the Rare trajectory. Conversely, those factors that are associated with an increased likelihood of following the Rare trajectory will have an exponentiated coefficient that is less than 1. Hence an exponentiated coefficient of 0.5 indicates that a one unit increase on the variable in question will reduce the odds of an individual not following the Rare trajectory by half.

### Comparison of Chronic and Rare Trajectory

The model revealed that those individuals who were members of the Chronic trajectory were significantly less likely to have difficulty making friends ( $e^{\beta} = 0.520$ ,  $p = .002$ ). Here the exponentiated coefficient indicates that a single point increase on the measure of Difficulty Making Friends would decrease the odds of an individual belonging to the Chronic trajectory by almost half ( $0.52 \times$  unconditional odds). Members of the Chronic trajectory were also less likely to be dissatisfied with their level of popularity ( $e^{\beta} = 0.587$ ,  $p = .008$ ). Rebelliousness in high school substantially increased the odds of belonging to the Chronic trajectory ( $e^{\beta} = 5.355$ ,  $p = .000$ ), as compared to the Rare trajectory (See Figure 5). Among male respondents, a single point increase on the measure of traditional sex role beliefs would multiply the odds of following the Chronic trajectory by a factor of 1.44. There was also a nonsignificant tendency for the Chronic drinkers be more likely to come from homes with higher income levels than those in the Rare trajectory ( $e^{\beta} = 1.529$ ,  $p = .054$ ).

### Comparison of Increased and Rare Trajectory

In contrasting the Increased and Rare trajectories, the analyses revealed that individuals in the increased trajectory were more likely to report higher levels of depression ( $\underline{e}^{\beta} = 2.920$ ,  $p = .001$ ), and were less likely to have difficulty making friends in high school ( $\underline{e}^{\beta} = 0.586$ ,  $p = .028$ ) than those in the Rare trajectory. Being female greatly decreased the chances of being in the Increased trajectory, compared to the Rare trajectory ( $\underline{e}^{\beta} = 0.155$ ,  $p = .003$ ). Although not statistically significant, there was some evidence of a relationship between household income and the likelihood of following the Increased trajectory. Having a higher household income tended to increase the odds of being in the Increased trajectory, rather than the Rare trajectory ( $\underline{e}^{\beta} = 1.627$ ,  $p = .061$ ) (see Figure 6).

### Comparison of Decreased and Rare Trajectory

Adolescent rebelliousness substantially increased an individual's likelihood of following the Decreased trajectory rather than the Rare trajectory ( $\underline{e}^{\beta} = 4.908$ ,  $p = .000$ ). Individuals who were more dissatisfied with their level of popularity in high school ( $\underline{e}^{\beta} = 0.628$ ,  $p = .026$ )



were less likely to be in the Decreased trajectory (See Figure 7).

#### Comparison of Fling and Rare Trajectory

More rebellious individuals were more likely to be in the Fling trajectory than the Rare trajectory ( $e^{\beta} = 1.883$ ,  $p = .042$ ). Being female reduced the odds of being in the Fling trajectory, as compared to the Rare trajectory ( $e^{\beta} = 0.286$ ,  $p = .019$ ) (see Figure 8).

#### Traditional Sex Role Beliefs and Self-esteem

Because of the *a priori* assumption that the relationships of Traditional Sex Role Beliefs and Self-esteem with Alcohol use would differ by sex, I conducted separate analyses of these variables for each sex. The only statistically significant effect was found among the males in the Chronic trajectory. Among males, more traditional Sex Role Beliefs increased the odds of following the Chronic trajectory, as compared to the Rare trajectory. A single point increase on the measure of Traditional Sex Role Beliefs would multiply the odds of an individual following the Chronic trajectory by 1.399 ( $e^{\beta} = 1.399$ ,  $p = .037$ ).

Contrary to expectations Self-esteem had a non-significant protective effect for both females and males--with the exception of the males in the Fling trajectory. The males in the Fling trajectory showed a very slight, non-significant tendency to have higher self-esteem than the males in the Rare trajectory ( $e^{\beta} = 1.023$ ,  $p = .910$ ). Otherwise the males in the Rare trajectory tended to have slightly higher self-esteem than their peers who followed different trajectories. The only significant effect of Self-esteem revealed by these analyses was among the females in the Decreased trajectory. The model revealed that, among the females, low levels of self-esteem in high school increased the odds of following a Decreased trajectory ( $e^{\beta} = 0.692$ ,  $p = .003$ ).

Figure 5

Chronic versus Rare Trajectories: Change in Odds of

Following Chronic Trajectory due to Selected Variables

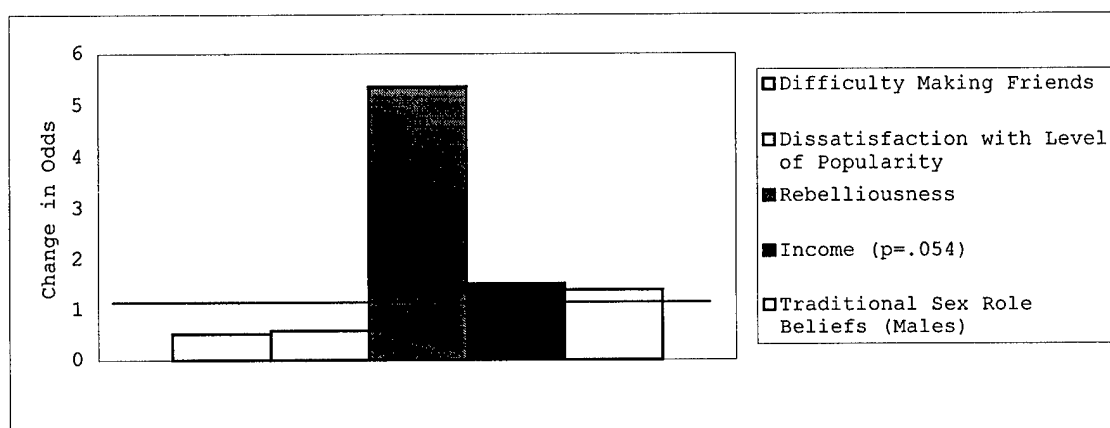


Figure 6

Increased versus Rare Trajectories: Change in Odds of

Following Increased Trajectory due to Selected Variables

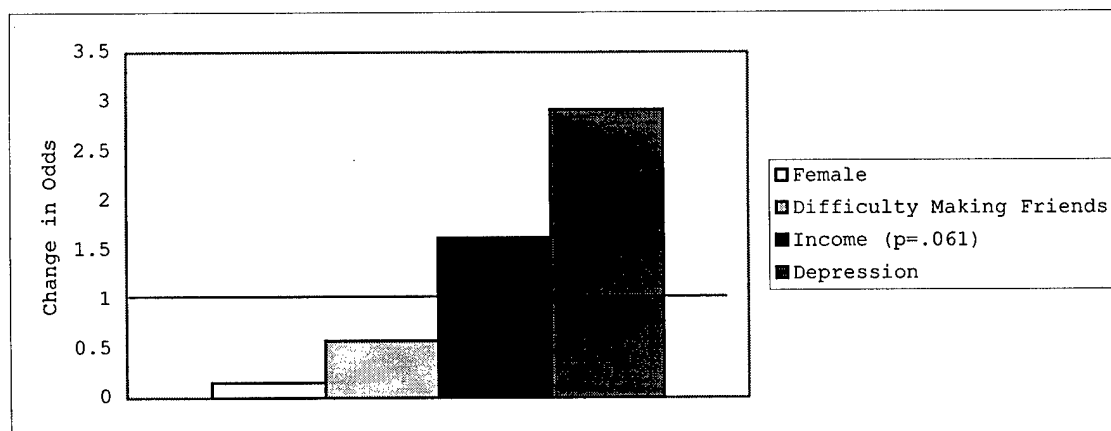


Figure 7

Decreased versus Rare Trajectories: Change in Odds of Following Decreased Trajectory due to Selected Variables

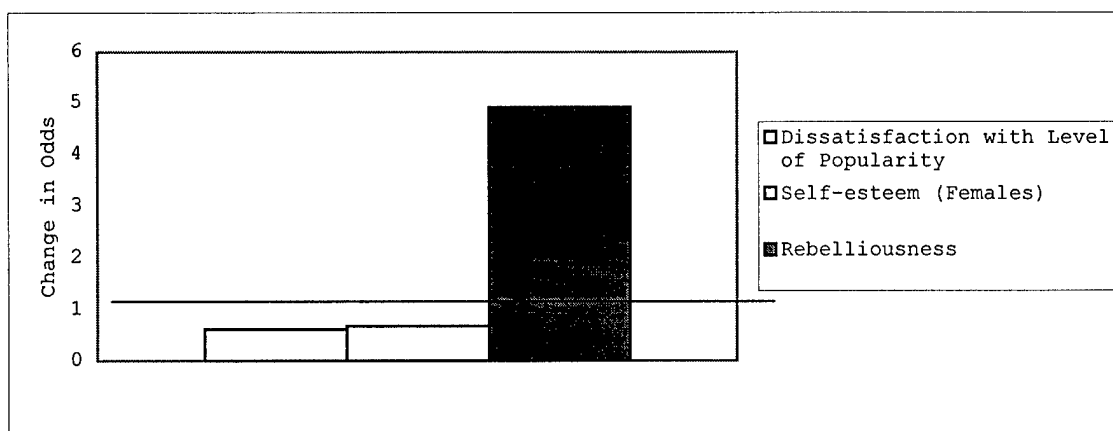
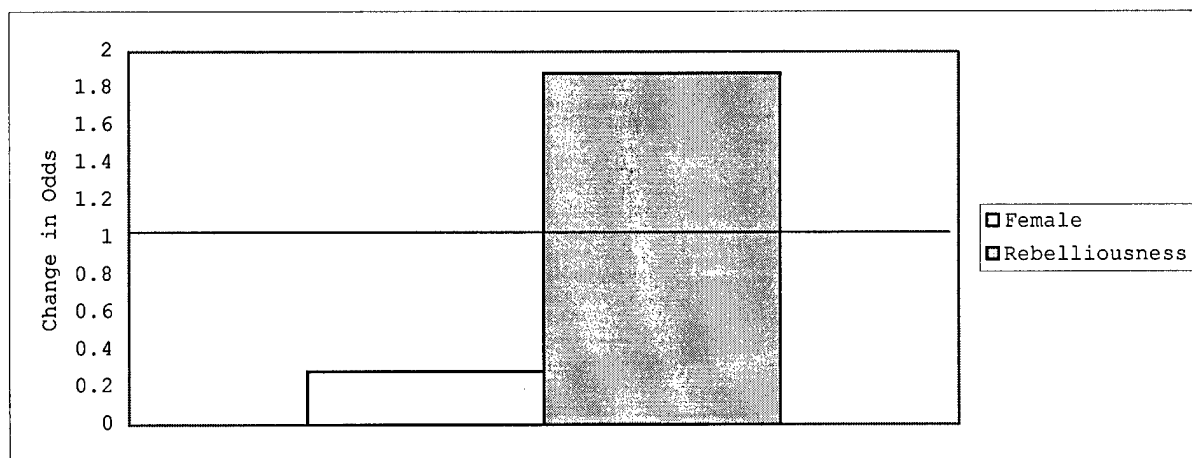


Figure 8

Fling versus Rare Trajectories: Change in Odds of Following Fling Trajectory due to Selected Variables

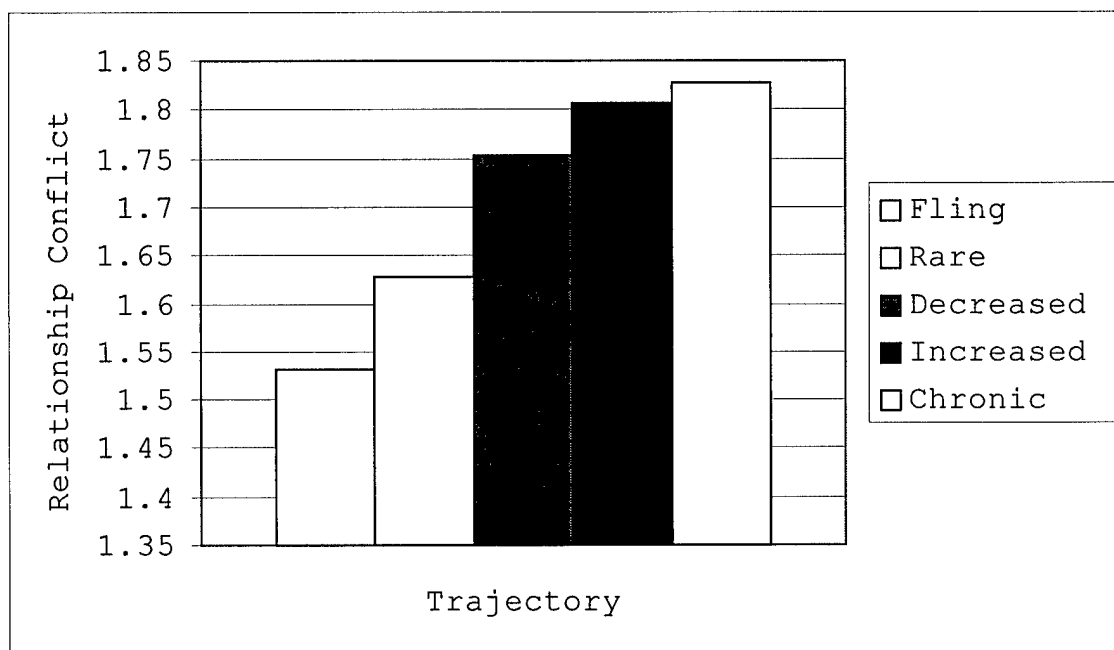


*Are the alcohol use trajectories in the sample related to specific young adult outcomes?* The final step in these analyses was to determine what relationships exist between the alcohol use trajectories present in the sample and outcomes in young adulthood. I used an Analysis of Variance (ANOVA) model to explore group differences between the various alcohol use trajectories on measures of Educational Attainment and Relationship Conflict in young adulthood. The sample for these analyses consisted of all individuals who had completed the Educational Attainment and Relationship Conflict questions at the final time of measurement in addition to completing the alcohol use item at each wave. The eligible sample consisted of 579 individuals (391 female, 188 male).

The analysis revealed that there were no significant group differences in Relationship Conflict among the trajectories ( $F = 2.164$ ,  $p = .072$ ). However, a graph of the mean reported Relationship Conflict for each trajectory does show some support for the suggestion by Jennifer Maggs and her colleagues (1997) that increased alcohol use is related to increased involvement in very negative or abusive relationships (See Figure 7).

Figure 6

Mean Reported Relationship Conflict (By Trajectory)

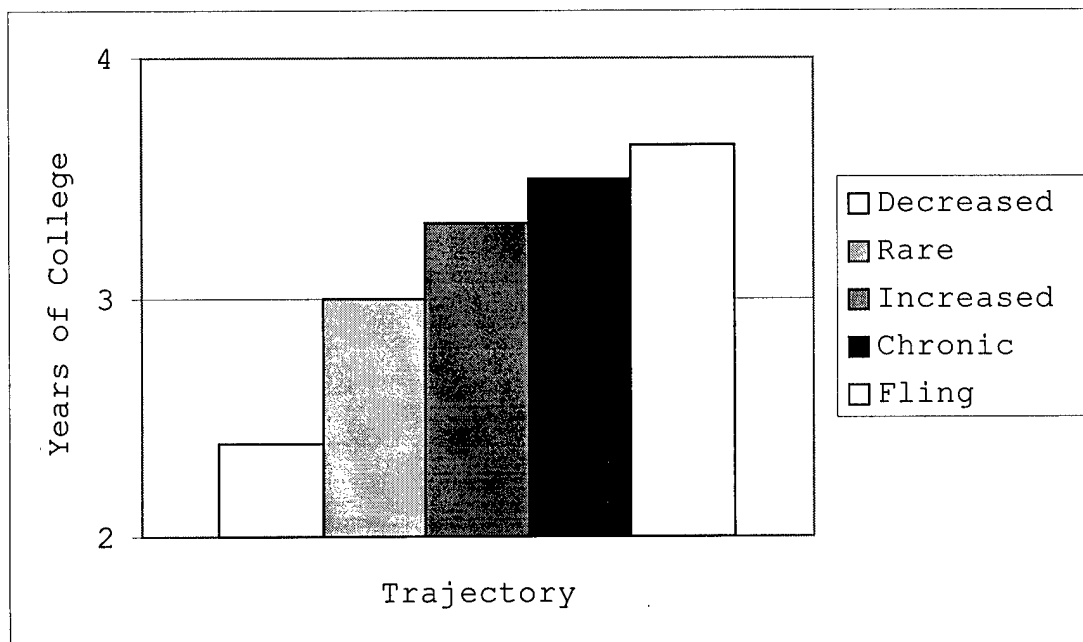


The data also revealed evidence of a significant association between the different trajectories and educational outcomes ( $F = 4.389$ ,  $p = .002$ ). Post hoc analyses using Scheffé's multiple comparison procedure revealed significant differences among individuals in the Chronic, Fling and Decreased trajectories (See Figure 8). The mean difference in Educational Attainment between individuals in the Chronic trajectory and those in the Decreased trajectory was 1.1038,  $p = .022$ . This reflects a difference in educational attainment of more than one year of college between the chronic drinkers (with an average of slightly more than three years of college) and individuals in the Decreased trajectory who's mean education level was a

little more than two years of college or an associate's degree. A similar relationship was found between the individuals in the Decreased trajectory and those in the Fling trajectory (Mean difference = 1.2439,  $p = .012$ ). Reflecting a mean educational attainment level of approximately 3 and one-half years of college among individuals in the Fling trajectory.

Figure 8

Mean Reported Educational Attainment (By Trajectory)



Given the finding that educational attainment was associated with the heavy alcohol use trajectories I conducted an additional analysis to determine if college

attendance was a risk factor for increased alcohol use. An independent samples t-test revealed that those individuals who had attended a four-year college had the same level of alcohol use in high school as their non-college bound peers ( $p = .895$ ). However, those participants who attended college did report significantly higher alcohol use than non-college attendees in both of the succeeding reports. The mean differences between the two groups represent approximately 2 additional drunken episodes every six months for the college students versus their non-college peers at age 21 and at age 24.



## CHAPTER 4

### DISCUSSION

#### Summary Of Major Results

I expected each of the variables to have a significant relationship with alcohol use in high school; the results of the present study support the presence of these relationships. I had hypothesized that adolescents who placed more importance on social success and peer acceptance would be more involved with alcohol use in high school. Consistent with the findings of Marks, Graham and Hansen (1992), peer orientation was found to be positively related to alcohol use. Individuals who reported greater peer focus, greater importance of social success, and (among males) more satisfaction with their level of popularity, tended to report higher levels of alcohol involvement; reflecting the influence of peers and perceived social norms on adolescent behavior.

Negative Affect and Antisocial Behavior were both expected to be positively correlated with concurrent alcohol use. Consistent with previous research by Hussong, Curran and Chassin (1998), Negative Affect was positively correlated with concurrent alcohol use. Antisocial Behavior

was also positively correlated with concurrent alcohol use, consistent with Bryant, Schulenberg, Bachman, O'Malley and Johnston (1998).

Traditional Sex Role Beliefs were expected to be positively correlated with concurrent alcohol use among men (Blazina and Watkins, 1996), but negatively correlated among women (Parker and Harford, 1992). Among the male participants, Traditional Sex Role Beliefs were indeed positively correlated with concurrent alcohol use. However the analyses showed no association between Traditional Sex Role Beliefs and concurrent alcohol use among the women in this sample.

Poor social skills (Difficulty Making Friends) were expected to have a positive relationship with alcohol use. The analyses revealed a negative relationship between self-perceived deficiencies in social skills and alcohol use, contrary to the findings by Hover and Gaffney (1991). This suggests that those individuals who report being most capable of making friends are more likely to be more fully engaged in the adolescent social environment and its concomitant alcohol use.

One other result contrary to expectations in the first set of analyses was the finding that the association between Dissatisfaction with Level of Popularity and alcohol use was different for males and females. Based on research by

Richard Budd and his colleagues (1985), I expected both males and females who were more engaged in the adolescent social environment (more popular individuals) to report higher levels of alcohol involvement. Although this held true for the males, among the females increased dissatisfaction with their level of popularity was related to increased alcohol involvement.

One possible explanation for gender differences in the relationship of popularity with alcohol use may be due to stereotyped sex roles. If heavy drinking were more acceptable for a man than for a woman, heavy drinking men would be less likely to be scorned than heavy drinking women. This could account for lower levels of self-perceived popularity among those females who tend to drink more heavily than their peers. This would also account for the higher levels of self-perceived popularity among heavy drinking males.

The goal of the next set of analyses was to explore possible relationships between the psychosocial indicators measured in adolescence and changes in alcohol use during the transition to young adulthood. The HLM analyses revealed that the majority of the variables had a significant association with the initial state of alcohol involvement (intercept term), reflecting their important relationship with concurrent alcohol use. Several of the

psychosocial variables (Worry about the Future, Rebelliousness, and Serious Problem Behavior) were also significantly related to the mean change in alcohol use over time (slope term); this suggests the value of these variables in understanding change over time in the pattern of alcohol use for this sample. The HLM analyses also revealed significant variance about the mean in both the initial status and change over time in alcohol involvement, suggesting the presence of multiple trajectories varying from the mean alcohol use pattern of the sample.

Cluster analysis was able to replicate the trajectories identified by John Schulenberg and his colleagues (Schulenberg, O'Malley, Bachman, Wadsworth and Johnston 1996). The ability to replicate these trajectories, both in separate studies and within the same study (using split-half reliability) confirms the existence of several distinct, robust trajectories of alcohol use.

My hypotheses were partially supported by significant relationships between a set of psychosocial variables and each of the trajectories. I had posited that higher reports of Dissatisfaction with Level of Popularity would indicate a weaker connection with the peer group, and result in lower levels of alcohol use at Time 1 and Time 2, when the impact of perceived peer norms on alcohol related behavior is strongest. This hypothesis was supported by the significant

association between Dissatisfaction with Level of Popularity and increased likelihood of following the Rare trajectory (as opposed to either the Chronic or Decreased trajectories).

I posited that those individuals with the lowest reports of self-perceived social skills would report higher levels of alcohol use across the transition to young adulthood. Contrary to expectation however, Difficulty Making Friends actually seems to be a protective factor. Greater self-reported difficulty in making friends was associated with a reduced likelihood of following the Chronic or Increased trajectories. This suggests that those individuals with self-perceived social skills deficits are most likely not using alcohol as a means of self-medicating. Rather it appears that those individuals who report being most capable of making friends are more likely to be more fully engaged in the adolescent social environment, of which alcohol is a part. Similar findings have been reported by Eccles and Barber (1999), Fondacaro and Heller (1983), and by Chung and Elias (1996).

I did find the expected association between Rebelliousness in high school and increased probability of following the Decreased or Fling trajectory. This provides support for the hypothesis that alcohol may be used by adolescents as a means of overtly demonstrating their adult

status. Contrary to my hypothesis, Rebelliousness in high school was also associated with an increased probability of following the Chronic trajectory. It is possible that adolescent rebellion may extended to the last time of measurement (Age 24) due to a protracted period of transition into adulthood, possibly related to the pursuit of higher education. This possibility is supported by the finding that the level of educational attainment reported by individuals who followed the Chronic alcohol-use trajectory was among the highest in the sample.

Traditional Sex Role Beliefs among men were expected to have a significant association with the Chronic and Increased trajectories. Analyses revealed that more traditional sex role beliefs were indeed associated with the Chronic but not the Increased trajectory. This suggests that the influence of sex roles beliefs on the alcohol related behavior of the males in this study was substantial before they left high school but did not increase appreciably over the succeeding six-year period.

Self-esteem showed evidence of being a protective factor against elevated alcohol use for all groups. The only statistically significant relationship however was found in comparing females in the Decreased trajectory to females in the Rare Trajectory. Reports of high Self-esteem in high school were associated with reduced odds of following the

Decreased trajectory (and hence a greater likelihood of following the Rare trajectory). Although the mean level of self-esteem in the Rare trajectory was higher than in the Decreased trajectory, the highest mean level of Self-esteem was reported by those females in the Fling trajectory. This suggests that Self-esteem has a substantial protective effect during high school, but may become less influential over time.

Depression was expected to have a significant relationship with the Chronic and Decreased trajectories. The analyses revealed quite the opposite; Depression was found to have a significant relationship with the Increased trajectory. This may be due to the fact that the research reviewed for this study, concerning affect and alcohol use, was conducted with clinical populations although the sample for this study was non-clinical. A 1981 study by Martin Sieber with a non-clinical sample of Swiss men found that depression at age nineteen predicted alcohol use at age twenty-two; suggesting a different relationship between these variables among non-clinical populations.

In examining the relationships between alcohol use trajectories and young adult outcomes, I expected to find that individuals who followed a Chronic or Increased alcohol use trajectory would report significantly higher levels of conflict in their romantic relationships than other

participants. Although the data did not reveal a statistically significant relationship, there was a non-significant trend in the data that suggests support for the hypothesized relationship.

Given the conflicting findings concerning the relationship between the alcohol use and educational attainment (Karvonen, *et al.*, 1999; Maggs, *et al.*, 1997) I made no specific prediction in regard to the outcome of the analyses in this area. The analyses revealed support for the position taken by Jennifer Maggs and her colleagues. Those individuals who followed the trajectories representing greater involvement with alcohol (Chronic and Fling) were likely to complete more years of education than their peers who reported less frequent drunkenness.

This study was designed to examine the relationships between a collection of psychosocial variables and trajectories of alcohol use during the transition to early adulthood. Previous studies of adolescent alcohol use have identified the trajectories that were found in this study but have not successfully related psychosocial variables to these trajectories. This study contributes to the existing literature by suggesting a number of antecedent characteristics that may be useful in distinguishing those adolescents at risk of following a trajectory of continued or increased alcohol use. Additionally, this study provides



further insight into the relationship between differing patterns of alcohol use and young adult outcomes in the educational and relational domains.

#### Limitations Of The Current Study

In interpreting these results, it is important to remember that all of the measures used in this study were drawn from individuals' self reports. This may limit the validity of some of the measures, particularly those that are more social in nature. Given the finding of a significant association between self-perceived Difficulty Making Friends and the Chronic and Increased trajectories, future investigation of this relationship with more objective sociometric or outside observer rating of social skills is warranted.

Social desirability is also likely to influence any self-report measure. It is important to remember that these are self-perceptions, rather than objective measures, when interpreting these scales. Given the nature of the scales used in this study it is likely that some respondents may have under-reported or over-reported their actual status on some of the variables.

Additionally, unlike most studies of alcohol use I chose to use a subjective measure of alcohol use (Frequency ff

being drunk). By relying on self reports of intoxication frequency, I obtained a different view of alcohol use than would be provided by more objective quantity measures. Although (conceptually) some individuals could report no incidence of drunkenness even though they are consuming significant amounts of alcohol, I do not believe this is the case. This is supported by the fact that only fourteen individuals, from a sample of more than 600, reported no incidence of drunkenness. Conversely, individuals who may appear to have non-problematic patterns of alcohol use when measured with more objective measures--such as the standard five drink measure for binge drinking--may actually be experiencing significant negative effects from alcohol use if they are becoming intoxicated (while drinking fewer than five drinks) with some frequency. I believe that using a subjective self-report measure of intoxication provided a unique insight into alcohol use that may have been overlooked with other measures.

Attrition analysis was conducted to determine any differences that may exist between the sample that was analyzed and the larger group, consisting of all participants interviewed at the first time of measurement (MSALT Wave 6 = 12th Grade). Results indicate that the participants retained in the study were more likely to be female. This differential attrition is mitigated by the

fact that females were still over-represented in the final sample. Individuals who completed the study also reported less serious problem behavior in high school, held more egalitarian gender role beliefs, and had less extreme peer focus. Additionally, their self-perceived popularity was lower than that of the participants who dropped out of the study. Of these characteristics, Traditional Sex Role Beliefs and Dissatisfaction with Level of Popularity were found to have a significant relationship with the alcohol use trajectories. The differential attrition of individuals with lower reported incidence of serious problem behavior and less extreme peer focus would have the effect of truncating the variance in the sample in each of these variables. These variables were not found to have a significant relationship with alcohol involvement, over time. It is possible that increased variability due to lower attrition (specifically differential attrition) may have resulted in significant findings in these areas. The fact that our sample may be skewed on these variables dictates a degree of caution in generalizing the findings to more socially diverse populations. Additionally, those remaining in the study for all three data collection periods reported fewer episodes of intoxication during high school than the participants who dropped out of the study.

Racial background and family income level were not significantly different between those who completed the study and those who did not. Although differential attrition did not appear to have a significant impact on the racial composition of the sample, the generalizability of these finding is limited by the predominance of European-Americans (93%) in the sample. One strength of the sample however is the wide variety of socio-economic levels represented, and the inclusion of individuals from suburban as well as urban communities.

Although the variables in this study focus on individual level effects, the effect of context cannot be dismissed. Indeed, the finding that those participants who attended college reported the same level of alcohol use as their non-college bound peers during high school, but reported significantly higher levels of alcohol involvement at both subsequent time points clearly indicates the substantial impact of the college environment. Likewise, the frequent findings of diminished alcohol use in adulthood indicate a substantial effect of other life contexts. Although the adolescent's environment is an important influence, individual level characteristics--such as those included in this study--still play an important role in explaining the complex picture of adolescent alcohol use.



## Conclusions

This study provides support for the existence of a significant relationship between a number of psychosocial variables and alcohol involvement, both concurrently and over time. Specifically, significant relationships with the alcohol use trajectories were found for Rebelliousness, Dissatisfaction with Level of Popularity, Difficulty Making Friends, Depression, Traditional Sex Role Beliefs among males, and Self-Esteem among females.

While adolescent rebellion may be associated with higher levels of drinking in high school, most of these individuals appear to "mature out" of heavy alcohol use (although some do persist). It also appears that those adolescents who report the greatest difficulty making friends and are least satisfied with their level of popularity are the least likely to report patterns of frequent intoxication. The most socially accepted adolescents appear to be the most heavily involved with alcohol during high school and in the years immediately after high school.

Depression had the most disturbing relationship with the alcohol use trajectories. Those adolescents who reported higher levels of depression in high school were 3 times as likely to increase their alcohol use over the course of the

study as their peers whose scores were a single point lower on the Depression scale.

Taken together these results show that alcohol use over the transition to young adulthood is associated with a variety of psychosocial variables measured in adolescence. Individuals who are less connected with their adolescent peers in high school are less likely to be heavily involved with alcohol in high school or over the following six years. Conversely, those individuals who report a stronger connection with their peer group report greater alcohol use. This suggests that alcohol use is a part of the normative adolescent experience; an experience that may also involve increased alcohol use during the college years.

Although a mild degree of social isolation may serve as a protective factor against higher levels of alcohol use, depression in high school is a substantial disposing influence. It seems somewhat paradoxical that difficulty making friends (which might be associated with a degree of depressive symptoms) has a protective effect in relation to alcohol use, but depression itself has a disposing effect. This suggests that the depression associated with increased alcohol use may not be strongly tied to the adolescent social environment. It would be worthwhile for future studies to investigate the causes of the particular

depressive symptoms in adolescence that are associated with increased alcohol use.

Individuals who reported frequent use of alcohol throughout the study were also likely to report more positive perceptions of their social abilities and satisfaction with their level of popularity. The positive relationships of perceived social skills and popularity with alcohol use throughout the transition to young adulthood suggest that social drinking among this sample is normative and does not seem to be negative.

The relationships between alcohol use and a number of the variables in the study suggest a possible link between identity formation and alcohol use in adolescence. According to identity theory (Erikson 1950, 1968), as American teenagers search for a sense of identity they experiment with a number of different roles (Santrock, 1998); alcohol use is likely to be one aspect of this experimentation. Many of the psychosocial variables included in this study have been related to the search for identity during late adolescence. It is possible that the differing levels and patterns of alcohol use reported in this study may be related to various stages of identity formation.

Previous researchers have found that adolescents in a state of identity diffusion report the lowest levels of



warm, open communication at home (Papini, 1994). This may dispose these individuals to greater incidence of adolescent rebellion and problem behavior; behaviors that were both demonstrated to have a significant relationship with greater alcohol use in this and other studies.

Most foreclosed individuals are afraid of rejection by the group (Frank, Pirsch, and Wright, 1990; Kroger, 1995). Similarly, individuals in a state of identity confusion may choose to lose their identity in the crowd of their peers (Erikson 1950, 1968, as cited in Santrock, 1998). These individuals may be more at risk of greater alcohol use due the desire to adhere to perceived peer norms, as reflected by the relationships between lower Dissatisfaction with level of popularity, greater emphasis on social success and elevated alcohol involvement among individuals in the present study.

Adolescents who are identity achieved have a higher sense of self-esteem and are more advanced in moral reasoning (Josselson, 1994; Marcia, Waterman, Matteson, Archer and Orlofsky, 1993). Not surprisingly, self-esteem was shown to have a protective relationship with alcohol use in adolescence. It seems plausible that the normative alcohol use of American adolescence may indeed be one manifestation of their search for a sense of self.

Researchers in the field of adolescent alcohol use have recognized alcohol use in adolescence as a risk behavior and as a normative behavior for this group. Much of the literature to date has not separated risk factors associated with problematic alcohol use from those associated with more normative alcohol involvement (Chassin and DeLucia, 1996). The current findings suggest that even reports of frequent alcohol use (up to the age of twenty-four for individuals in this study) may be indicative of normative social drinking.

In considering practical applications, this study supports the suggestion that there are significant individual differences in patterns of alcohol use during this period in the lifespan. Programs targeted at modifying alcohol use among the adolescent population will need to consider these differences in planning effective interventions.

It also appears that alcohol use is a normative feature of the adolescent experience. This study suggests that many adolescents may be using alcohol to adhere more closely to perceived peer norms. Although most American teenagers will likely engage in alcohol use to some degree during high school and college, it may be possible to limit the extent of their involvement. Interventions aimed at increasing adolescents' awareness of actual peer alcohol use levels may be effective in reducing the quantity of alcohol consumed.

Although the relationship of depression in high school to a pattern of continually increasing involvement with alcohol throughout this period suggests a less social, possibly more problematic pattern of alcohol involvement, individuals who followed this pattern could not be distinguished from their more normative peers in high school based solely on their reports of alcohol involvement. These findings suggest that simple quantity and frequency measures of alcohol use common to this type of research may not be sufficient to determine the relationships between risk factors and problematic alcohol use.

In addition to recognizing the importance of distinct drinking patterns among adolescents, future research in this area should explore the possibility that other factors not considered here may be closely associated with each of the these trajectories. Even though a number of significant relationships were found they accounted for a relatively small amount of the overall variance. This suggests that there are variables not included in this study that may have substantial explanatory power. Future research could profit from an investigation of other variables (religiosity, legal drinking age, transition variables such as entry into the work force or marriage, etc.) that may also have significant relationships with these trajectories of alcohol use. It would also be worthwhile to explore any relationships that

may exist between these alcohol use trajectories and measures of alcohol dependence and alcohol abuse in adulthood.

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## APPENDIX A (CORRELATION MATRIX)

Alcohol	Serious Problem Behavior	Rebelliousness	Self-Esteem	Depression	Future Worry	Importance of Social Success	Dissatisfaction with Level of Popularity	Extreme Peer Focus	Difficulty Making Friends
-									
Serious Problem Behavior	.384**	-							
Rebelliousness	.486**	.486**	-						
Self-esteem	-.068*	-.013	-						
Depression	.061*	.001	-.428**	-					
Future Worry	.063*	-.006	-.335**	.517**	-				
Importance Of Social Success	.252**	.229**	.054	.041	.044	-			
Dissatisfaction with Level of Popularity	.058	.135**	-.188**	.154**	.136**	.509**	-		
Extreme Peer Focus	.321**	.376**	-.133**	.185**	.186**	.386**	.373**	-	
Difficulty Making Friends	-.140**	-.022	-.249**	.163**	.150**	-.222**	.185**	.030	-
Traditional Sex Role Attitudes	.133**	.264**	.029	-.060*	.023	.205**	.198**	.279**	.042

\*\* Correlation Is Significant At The 0.01 Level

\* Correlation Is Significant At The 0.05 Level

Alpha

Household Income	N/A
About how much is your current family income each year? (If you live with one of your parents, only give the income for that parent).	
Responses: 1=\$10,000 or less to 6=\$80,000 or more	

Alcohol Involvement	N/A
During the last six months, how often did you get drunk?	
Responses: 1=never to 7=21 or more times	

Serious Problem Behavior	0.71
During the last six months, how often did you...	
Damage public or private property?	
Have contact with the police for something you did or that they thought you did?	
Take something from a store without paying?	
Carry a weapon?	
Break into a building to steal something?	
Get into a fist fight with another kid?	
Responses: 1=never to 7=21 or more times	
Rebellious Behavior	0.81

During the last six months, how often did you...	
Disobey parents on an important issue?	
Lie to parents about something important?	
Do some pretty risk things because it was a real kick?	
Stay out all night without your parents' permission?	
Do something you knew was dangerous just for the thrill of it?	
Responses: 1=never to 7=21 or more times	

Alpha      Alpha  
(Males) (Females)

Self-esteem	0.77	0.83
How often do you feel good about yourself?		
How often do you feel satisfied with yourself the way you are?		
How often do you feel sure of who you are (what kind of person you are)?		
Responses: 1=never to 7=daily		
Depression		0.73
How often do you feel unhappy, sad or depressed?		

How often do you feel lonely?	
How often do you lose your appetite or eat a lot when you get upset?	
How often do you feel that difficulties are piling up so high you can't overcome them?	
Responses: 1=never to 7=daily	

Future Worry	0.79
How often do you worry that you will not get a good job when you are an adult?	
How often do you feel discouraged about the future?	
Responses: 1=never to 7=daily	

Importance of Social Success	0.75
For me being popular is . . .	
How important is it to you to be popular with members of the opposite sex?	
For me, making friends is . . .	
Responses: 1=not at all to 7=very important	
Dissatisfaction with Level of Popularity	0.74
I wish I were more popular	
I wish I were more popular with members of the	



opposite sex.	
Responses: 1=strongly disagree to 7=strongly agree	

Peer Focus. Fuligni's measure of extreme peer focus (Fuligni & Eccles, 1993)	0.68
Would you let your work slip or get a lower grade to be popular with friends?	
It's okay to break parents' rules to keep your friends.	
Responses: 1=never to 7=always.	
How much does the amount of time you spend with your friends keep you from doing other things you ought to do?	
Responses: 1=takes away no time, 7=takes away a lot of time.	
Would you act dumber or less talented than you really are to make someone like you?	
Responses: 1=definitely not, 7=definitely yes	

Difficulty Making Friends	0.72
How hard is it for you to make friends?	

Responses: 1=very easy to 7=very hard.	
Compared to other kids your age, how difficult is it for you to make friends?	
Responses: 1=much less difficult to 7=much more difficult	

Alpha      Alpha  
(Males) (Females)

Traditional Sex Role Beliefs	0.81	0.72
In general, men are more reliable on the job than women		
It is usually better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family.		
Men are naturally better at mechanical things than women.		
A wife's relationship with her husband is better if she doesn't place too much importance on her job		
If someone's career needs to suffer for the good of the family, it should be the wife's and not the husband's		
Responses: 1=strongly disagree to 7=strongly agree		

Educational Attainment	N/A
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What was the last year of schooling you completed?	
Responses: 1= No high school diploma	
2= High school diploma	
3= Vocational/Technical Training.	
4= 1 year of college	
5= 2 years of college	
6= 3 years of college	
7= 4 years of college	
8= College graduate (BA/BS)	
9= Graduate schooling	

Relationship Conflict	0.78
During the past month, how often did your partner(s) or date(s). . .	
Shout or yell at you because s/he was mad at you?	
Get into a fight or argument with you?	
How many times in the past 12 months did your partner(s) or date(s). . .	
Throw something at you?	
Push, grab, hit, kick, or shove you or hit you with something?	
Responses: 1=never to 7=more than 20 times	